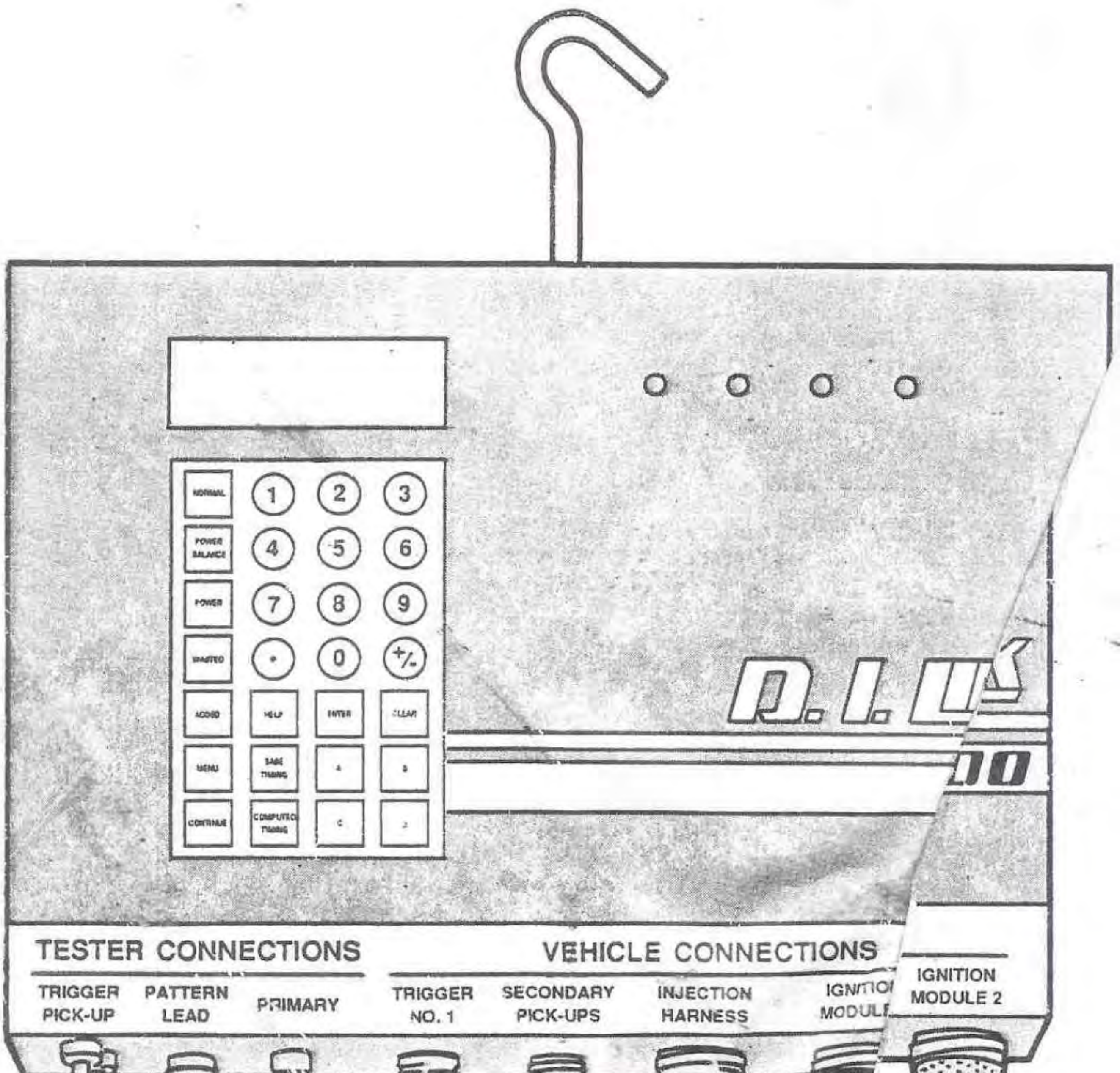
DIL-300

OPERATING INSTRUCTIONS
ALL VEHICLE CARTRIDGE



INTRODUCING SUN'S DIL-300

Distributorless ignition systems are being used on today's cleaner-burning and fuel-efficient engines. Sun's DIL-300 has special capabilities for testing these systems and provides complete test flexibility as well. Because it is **cartridge-driven,** you have a choice of test capabilities now and in the future.

Sun's DIL-300 works with the following Sun Engine Analyzers:

MEA-1500, Modular Engine Analyzer

1805Z, Interrogator Diagnostic Analyzer

MCA-3000, Modular Computer Analyzer

The DIL-300 is modular — you need only purchase the cartridges you need for your service shop. Current test cartridges include:

All Vehicle Secondary (AVS) Cartridge

The AVS cartridge allows easy retrieval of secondary information from the vehicle — scope patterns or dynamic secondary KV data — without the need to interface with ignition modules or ECM's. Through secondary hookups only, the DIL-300 can interface with four, six and eight-cylinder DIS-equipped vehicles.

HOW DISTRIBUTORLESS IGNITIONS WORK

Instead of a conventional distributor and coil, distributorless ignition systems consist of a combined ignition and coil module and various sensors; all are connected to some type of electronic control module (ECM) by an engine harness. The coils are double-ended and most common DIS equipped vehicles fire pairs of cylinders simultaneously.

HOW SUN'S DIL-300 WORKS

The DIL connects to the vehicle to gather operating information which is displayed on your Sun engine analyzer. Operator prompts make setting up the DIL-300 for the ignition system under test extremely easy and fast. This manual covers operating basics for the DIL-300 and the use of the All Vehicle System (AVS) cartridge which plugs into the DIL and allows specific tests to be performed.

UNIT FEATURES

(Figure 1)

POWER SWITCH AND INDICATOR LIGHT:

This switch should be pushed (light on) when all hookups are complete and the operator is ready to test.

LCD DISPLAY:

When used in conjunction with the keypad, it allows you to select the number of cylinders, firing order, coil polarity, as well as secondary, wasted, and power added values.

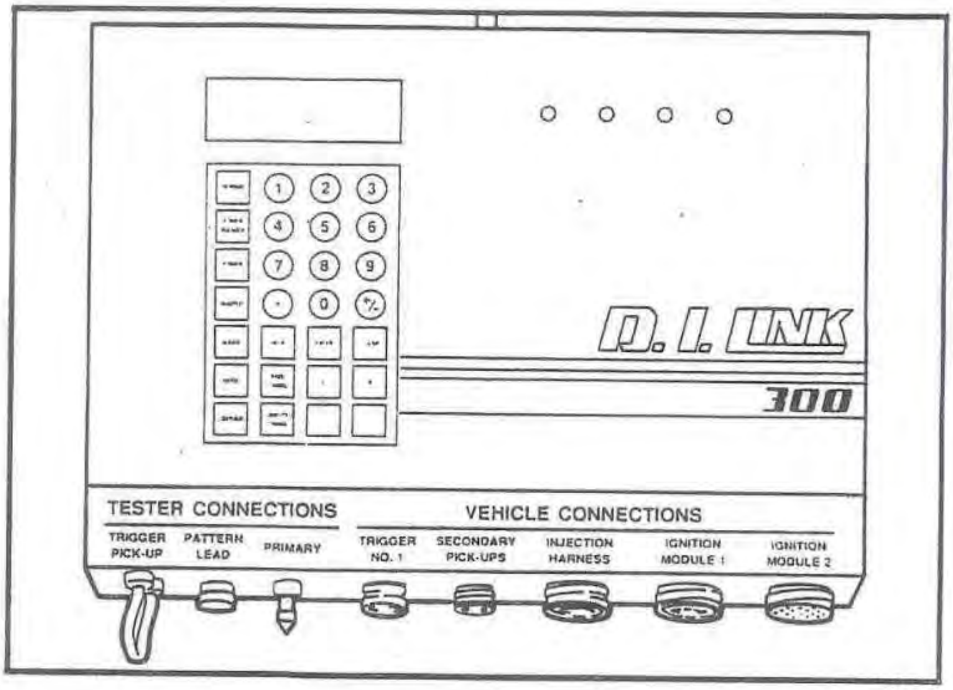


FIGURE 1

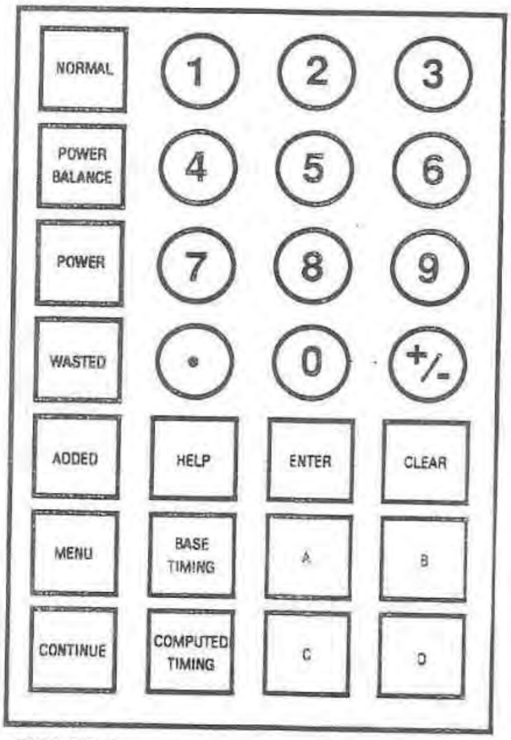


FIGURE 2

ALPHANUMERIC KEYPAD:

MENU	to select the number of cylinders.
NUMBER	to make numeric selections when prompted.
CONTINUE	to advance the display program forward.
ENTER	to enter a numeric selection.
CLEAR	to clear a numeric selection.
HELP	to display supplementary information for the current display.
ALPHA	A, B — for future use.
POWER	to select the power stroke mode of KV display.
WASTED	to select wasted stroke mode of KV display.
ADDED	to select added mode of KV display.
C	to scroll cursor LEFT
D	to scroll cursor RIGHT

THE BASICS — GETTING STARTED

To use the DIL-300, perform the following simple steps:

Power up the Sun analyzer as directed in the operator's manual and follow the prescribed warm-up and calibration procedures.

For the MCA	identify the vehicle being tested; set the TRIGGER control to AUTO.
For the 1805Z	enter the correct vehicle code for the vehicle being tested; set the ignition selector to the number 2 position.
For the MEA	enter the number of cylinders on the VEHICLE SETUP page. The magnetic timing offset angle and the number of cylinders will remain preset at 0.0 degrees and 4 cycles, respectively.

Hang the DIL-300 from the underside of the open hood. From the DIL-300, in the area marked TESTER CONNECTIONS, make the following connections from your Sun engine analyzer: (Fig.3)

Clamp the RED trigger pickup around the TRIGGER PICKUP loop on the DIL-300. (Figure 3). Connect the BLUE primary lead to the PRIMARY post on the DIL-300. Remove the pattern pickup from the end of the BLUE pattern lead, and connect the lead to the PATTERN LEAD connector on the DIL. Connect the remaining leads from the analyzer as directed in your tester's operator manual.

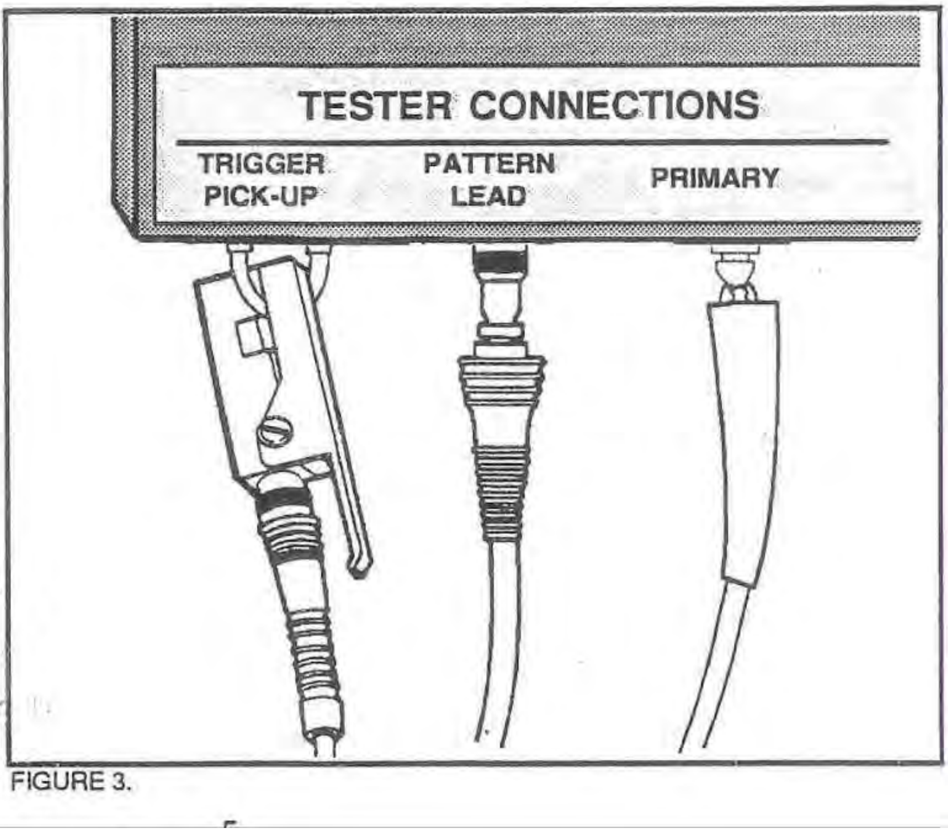


FIGURE 3.

Now connect the DIL-300 to the vehicle from the area marked VEHICLE CONNECTIONS (Figure 4). Special care should be taken when routing the leads so that they do not contact any moving parts or hot surfaces.

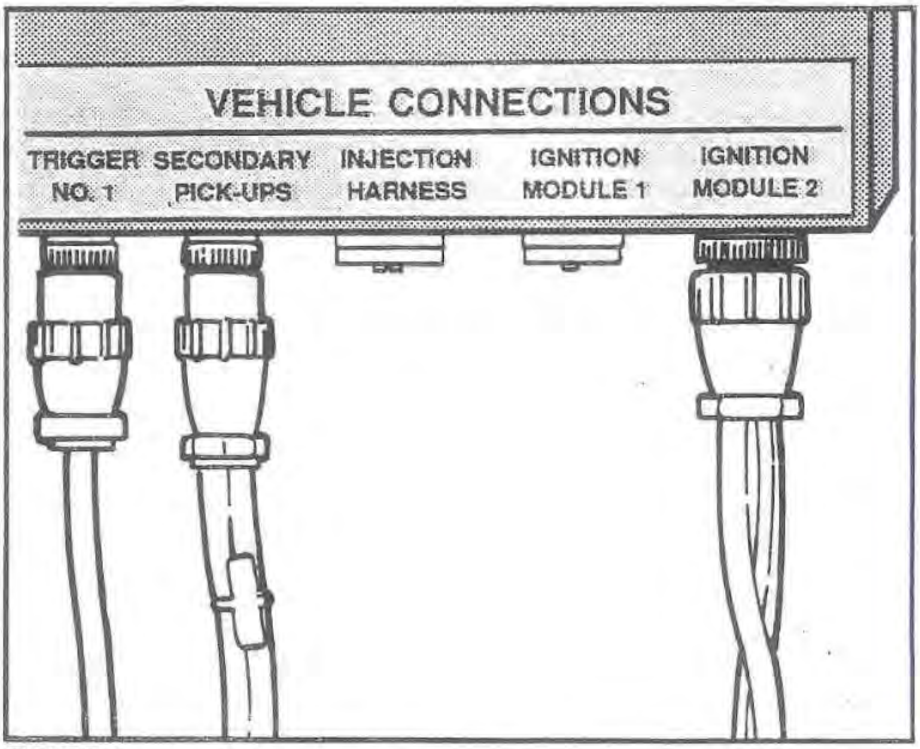


FIGURE 4

Attach the secondary pickup lead to the connector labeled SECONDARY PICKUPS on the DIL. Clamp the secondary pickup with the RED BAND to a positive firing spark plug wires. Clamp the other secondary pickup around a negative firing spark plug wires.

NOTE: The DIL-300's secondary pickups are spring-loaded; both secondary pickups must be closed tightly around each set of spark plug wires, to insure an accurate sensing of secondary signals. The pickup wires should be parallel, not crossed.

Attach the trigger pickup lead to the connector labeled TRIGGER NO.1 on the DIL-300. Clamp the pickup around the NUMBER 1 spark plug wire on the vehicle. If #1 plug wire is inaccessible, clamp the pickup to any plug wire. Enter the corresponding plug number into the DIL-300. Consult the appropriate service manual to identify this wire. (Figure 5).

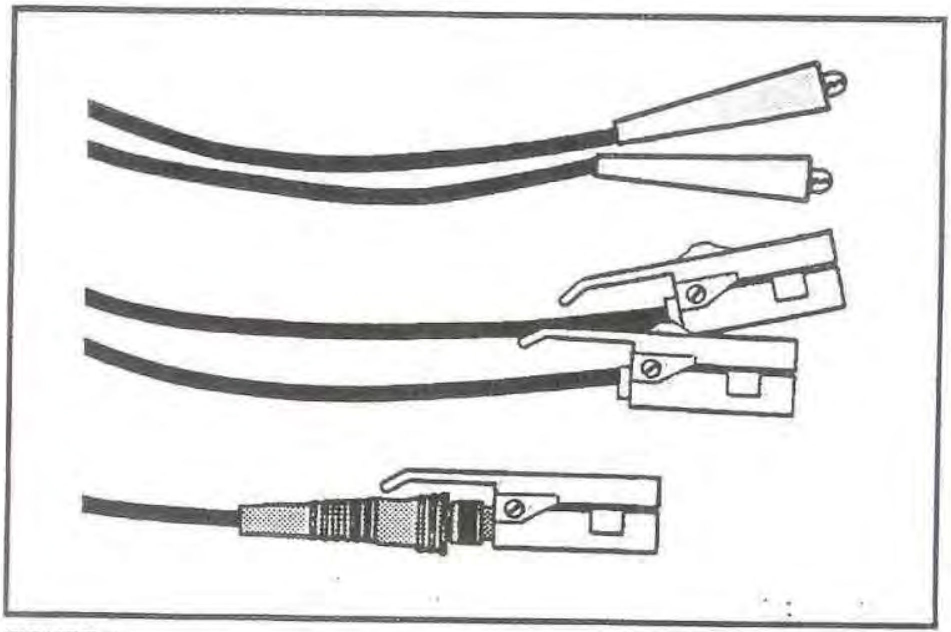


FIGURE 5

Connect the UNIVERSAL CABLE ASSEMBLY to the IGNITION MODULE 2 connection on the DIL-300. Connect the universal cable to the vehicle's battery — RED to positive, BLACK to negative.

Figure 6 shows a complete vehicle hookup.

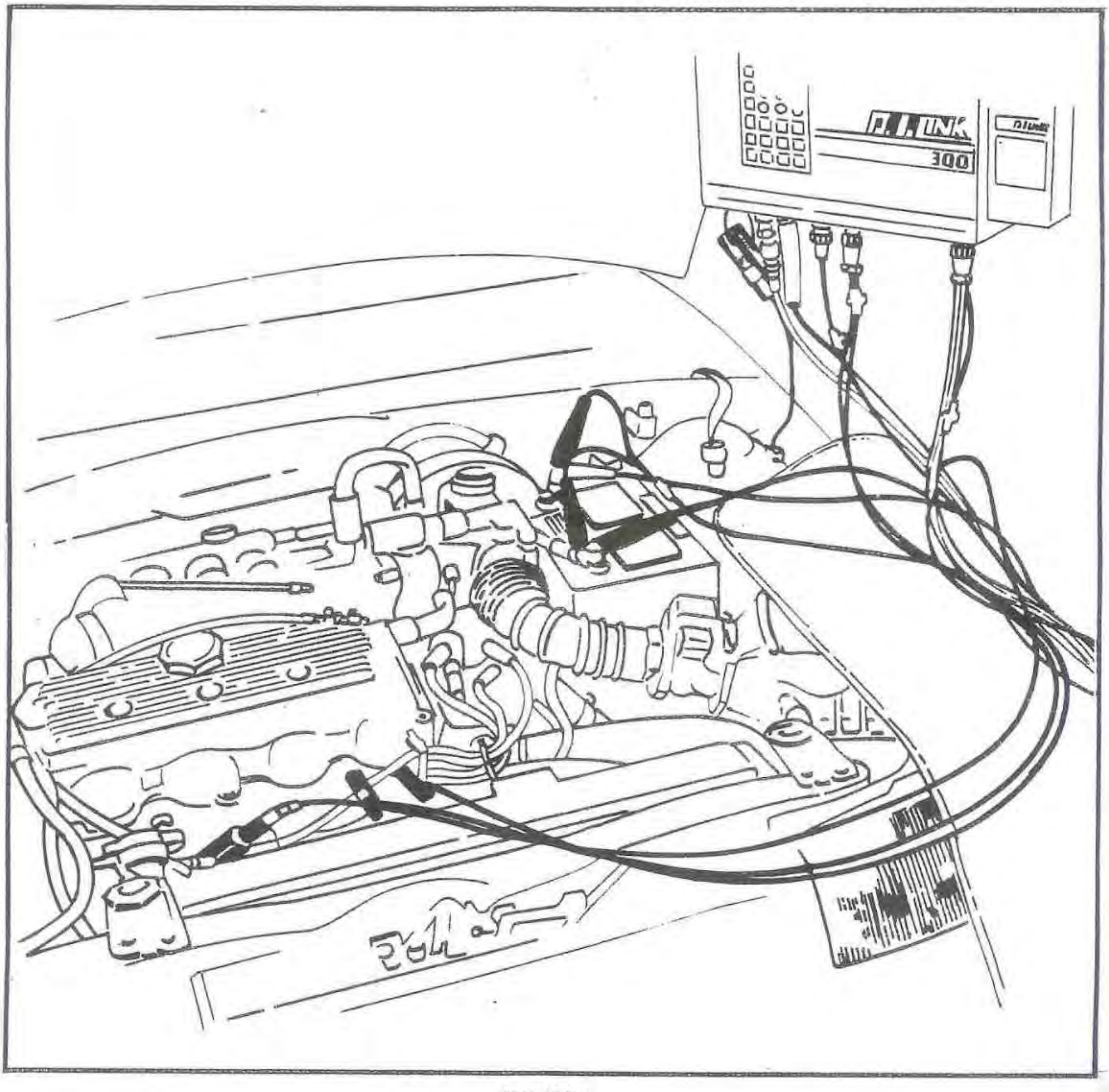


FIGURE 6

Insert the AVS Cartridge into the DIL-300 and turn the unit on. Now answer the prompts on the DIL-300. You'll be prompted for the following:

Enter the firing order 1 _ _ _ _ _ _ _

Enter the firing order of the vehicle being tested; duplicate numbers are not accepted. Press ENTER.

ENTER + - PATTERN

Enter the cylinder polarities of the vehicle being tested. For example:

1 3 4 2

+ + - -

Each entry of the + or - key will alternate polarity. Unequal number of + or - polarity entries are not accepted. The "C" key or cursor left (<) key will scroll the cursor left; the "D" key or cursor right (>) key will scroll the cursor right. The MENU key will get you back to the beginning if necessary. Now press ENTER.

That's all you need to set up the DIL-300 for AVS testing. The HELP key may be pressed if needed. Now you can begin using the DIL-300 to test distributorless ignition cars and display test results on your Sun analyzer.

TYPICAL ENGINE ANALYZER SCREENS

Here are some typical power, wasted and added mode readings obtained displayed on the MCA-3000 and 1805Z. (Figure 7)

Identified"POWER" MODE Cylinder # (Shown in cylinder # column)	Complementary (End of compression stroke, beginning of power stroke)	'WASTED' MODE Cylinder # (Not shown on VDU)	'ADDED' MODE (End of Exhaust stroke for complementary cylinder)	(Sum of the two voltage waveforms occurring when identified cylinder fires)
1	10.5	4	2.6	11.5
6	10.6	3	2.2	12.4
5	9.9	2	2.4	11.5
4	9.4	1	2.0	11.2
3	10.6	6	2.6	11.5
2	8.8	5	2.5	12.0

NOTE: The sum of the individual "Power" and the "Wasted" Firing KV readings are generally greater than the displayed "Added" Firing KV reading.

FIGURE 7. Sample Firing KV Test Readings

Here are three representative scope patterns obtained in the power added and wasted modes as displayed on the MEA-1500. (Figures 8, 9, 10)

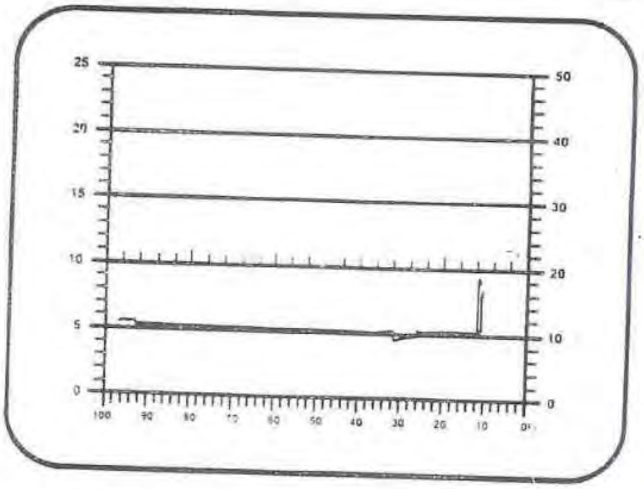


FIGURE 8. Secondary Superimposed Pattern-Power Mode

FIGURE 9. Secondary Superimposed Pattern-ADDED Mode

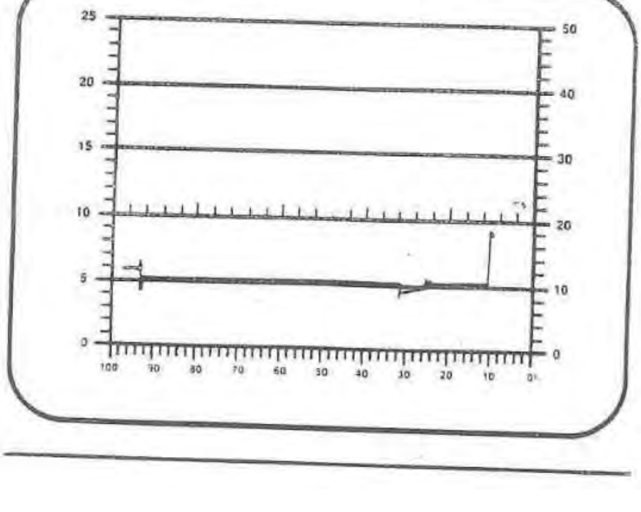
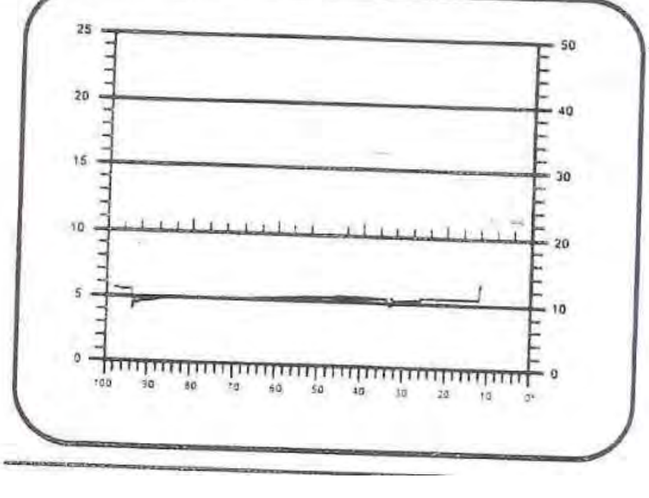
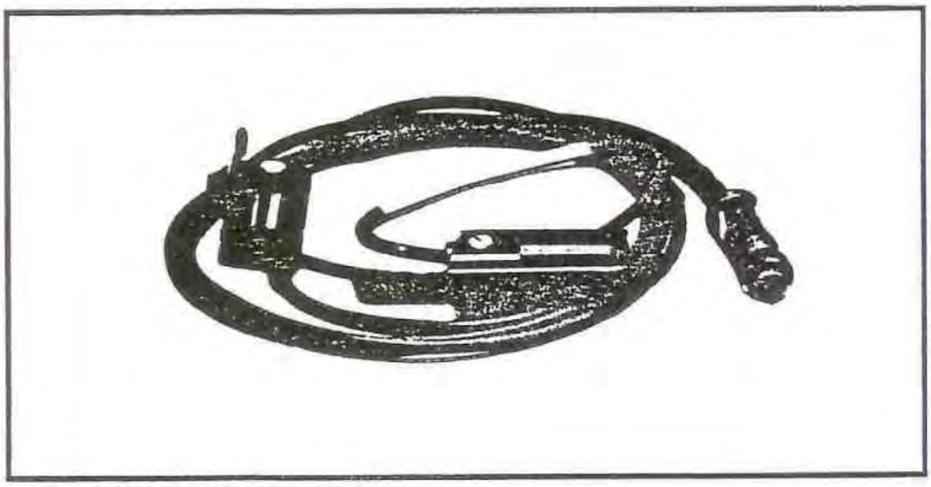


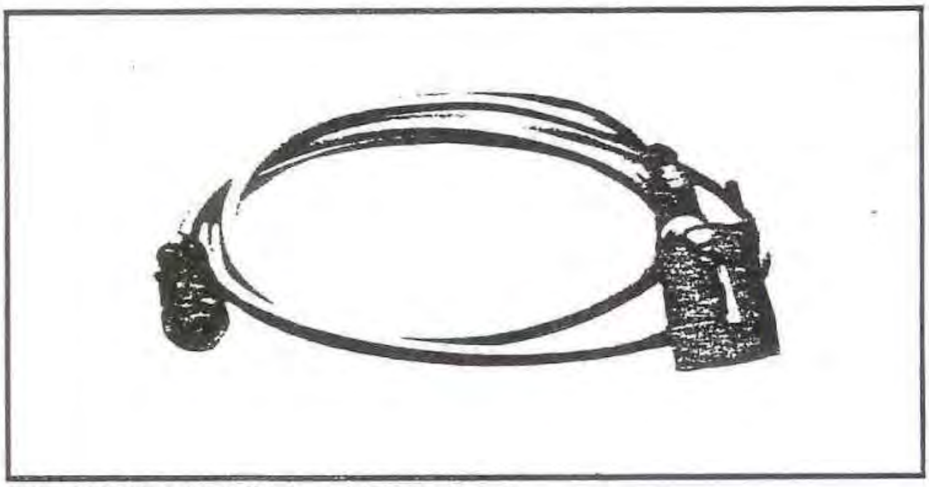
FIGURE 10. Secondary Superimposed Pattern-Wasted Mode



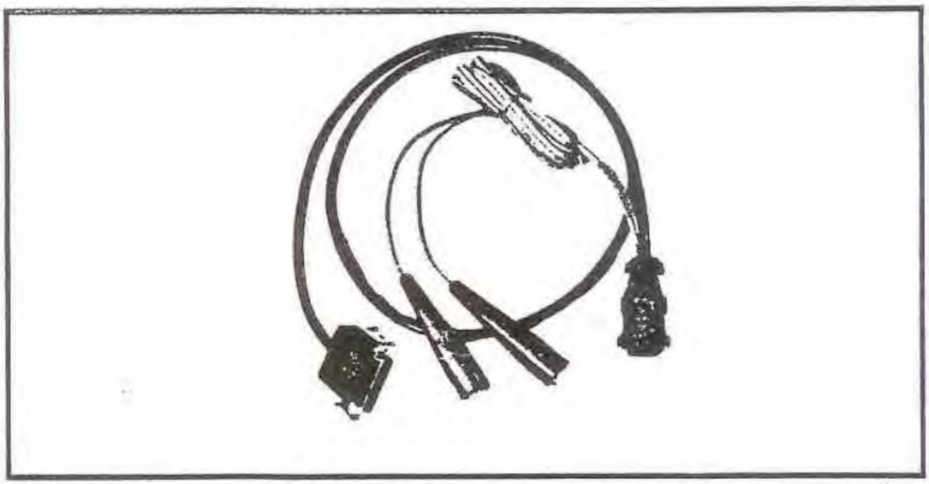
ACCESSORIES



6004-0544 Secondary Pickups



0507-006/6004-0262 Trigger Pickup and Lead



6004-0590-01 Universal Cable Assembly

GM DIL-300 Lead Hook-up Chart

Engine/System	Harness(s) Connections (Location)	Cylinder Number Firing Order Cylinder Pairs	Secondary Hook-up	
			Positive	Negative
2.0L 1987	"C" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylinder Pairs 1-4, 3-2	1-3	2-4
2.0L 1988 — 1989	"B" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylinder Pairs 1-4, 3-2	1-3	2-4
2.2L 1990	"B" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylinder Pairs 1-4, 3-2	1-3	2-4
2.3L (Quad 4) 1988	"C" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylider Pairs 1-4, 3-2	2-4	1-3
2.3L (Quad 4) 1989 — 1990 (Except W Body)	"C" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylinder Pairs 1-4, 3-2	2-4	1-3
2.5L 1987 — 1990	"B" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylinder Pairs 1-4, 3-2	2-4	1-3
2.5L (W Body) 1990	"D" (ECM)	1 2 3 4 Firing Order 1-3-4-2 Cylinder Pairs 1-4, 3-2	2-4	1-3
2.8L 1987 — 1989 Except Vin W In W Series	"C" (ECM)	1 3 5 2 4 6 Firing Order 1-2-3-4-5-6 Cylinder Pairs 1-4, 2-5, 3-6	2-3-4	1-5-6
2.8L 1988 W Series	"D"(ECM)	1 3 5 2 4 6 Firing Order 1-2-3-4-5-6 Cylinder Pairs 1-4, 2-5, 3-6	2-3-4	1-5-6
3.0L Type I 1985 — 1988	"A" (Coil Module)	2 4 6 1 3 5 Firing Order 1-6-5-4-3-2 Cylinder Pairs 1-4, 2-5, 3-6	1-3-5	2-4-6
3.1L 1989 — 1990 (W Body)	"D"(ECM)	1 3 5 2 4 6 Firing Order 1-2-3-4-5-6 Cylinder Pairs 1-4, 2-5, 3-6	2-3-4	1-5-6
3.1L 1989 — 1990 (Except W Body)	"C" (ECM)	1 3 5 2 4 6 Firing Order 1-2-3-4-5-6 Cylinder Pairs 1-4, 2-5, 3-6	2-3-4	1-5-6
3.3L 1989	"A" (Coil Module)	2 4 6 1 3 5 Firing Order 1-6-5-4-3-2 Cylinder Pairs 1-4, 2-5, 3-6	1-3-5	2-4-6
Holden 3800 3.8L Type I 1984 — 1988	"A" (Coil Module)	2 4 6 1 3 5 Firing Order 1-6-5-4-3-2 Cylinder Pairs 1-4, 2-5, 3-6	1-3-5	2-4-6
3.8L Type II 1984 — 1988	"A" (Coil Module) and Optional Injection Interface	2 4 6 1 3 5 Firing Order 1-6-5-4-3-2 Cylinder Pairs 1-4, 2-5, 3-6	1-3-5	2-4-6
3800 Type III 1988	"C" (ECM) and Optional Injection Interface	2 4 6 1 3 5 Firing Order 1-6-5-4-3-2 Cylinder Pairs 1-4, 2-5, 3-6	1-3-5	2-4-6

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